Translated Text of WO 2004/009,685 A1 (PCT/EP03/07921) with Amended Claims Incorporated Therein

CONTAINER-LIKE PACKAGES

The invention concerns plastic containers of types that are well known and commercially widely used, especially those made of styrene and/or polyolefins, for the packaging and long-term storage of food products and the like, such as salads, fruit extracts, beverages in disposable portion packs for beverage vending machines, toothpaste, etc.

The styrene and/or polyolefin container-like packages presently on the market have the disadvantage that their barrier properties against oxygen are inadequate, so that oxygen is able to diffuse into the closed plastic containers from the outside. The slow penetration of oxygen into the plastic container adversely affects the stability of the contents and prevents extended storage of the product.

Proceeding on the basis of this prior art, the objective of the invention is to improve the oxygen barrier properties of the container material by simple means without significantly altering the container material itself.

The stated objective is achieved by the characterizing features of Claim 1. To reduce the amount of oxygen penetrating the closed plastic container, the exterior and/or interior surface of the container is coated with a coating with oxygen barrier properties.

Advantageous modifications of the invention are specified in the dependent claims.

The coating of the container surface with a coating with oxygen barrier properties impedes the penetration of oxygen into the closed plastic container and thus significantly increases the storage time. To accomplish this, it is sufficient in many cases to coat only the exterior surface of the plastic container with the coating material. However, depending on the coating process that is used, which can be spray coating or dip coating, it can also be less expensive, for reasons related to process engineering, to coat the entire freely accessible surface of the plastic container in one operation, provided that the coating material is compatible with the contents of the container. In this case, the coating material must be chemically resistant to the contents of the container.

Coating materials based on modern epoxy resins or amine

adducts are generally used, and the coating layer is produced in the form of a monomolecular film. If necessary, however, it is also possible to apply several layers one over the other. Although a barrier layer or impervious layer built up in this way is more expensive to produce than a monomolecular film, it is then possible to build up individual layers of different materials, which can include a layer produced by metallization.

Depending on the production process, the materials that are used, and the buildup of layers, the thickness of the finished coating varies from about 0.003 μm to 0.03 μm, and preferably from 0.007 μm to 0.01 μm.

To ensure that the coating material is maintained as a complete coating during use of the plastic container and does not, for example, peel off, sufficiently strong adhesion of the coating material to the container surface to be coated must be guaranteed. To guarantee this level of adhesion, the surface of the container is pretreated before it is coated, so that it is then fat-free and/or dust-free and/or roughened.

Depending on the type of coating material, it can be necessary, for the purpose of improving the properties of the coating with respect to its adhesion to the surface of the

container, its compatibility with the contents of the container, or its mechanical strength, to treat the coating after it has been applied to the surface of the container, for example, to dry it or cure it. For example, this aftertreatment may involve heating or UV irradiation.

The finished coating that has been applied to the surface of the container, with or without aftertreatment, is distinguished by the fact that it is largely adapted to the container material and possibly to the container contents with respect to its properties, for example, its mechanical strength, thermal expansion, and chemical resistance.

The invention is explained in greater detail below with reference to two specific embodiments.

-- Figure 1 shows a top view of a plastic container sealed with a foil.

-- Figure 2 shows a side view of the plastic container in Figure 1.

-- Figure 3 shows the plastic container in Figure 1 in a vertical section rotated by 90°.

-- Figure 4 shows a side view of a plastic container sealed with a lid.

-- Figure 5 shows the plastic container in Figure 4 in a vertical section.

Figures 1, 2, and 3 show a plastic container 10 with a circular cross section in a top view (Figure 1), a side view (Figure 2), and a vertical section (Figure 3). The plastic container 10 is shaped like a cup with a flat base 12 and a side wall perpendicular to the base 12 and is sealed with a foil 13 with a pull tab 14. In accordance with the invention, this plastic container 10, which can be used, for example, to store a beverage, is coated on its entire outer surface 15 with a coating 30 that has barrier properties against oxygen. Due to the very small thickness of this coating 30, the coating 30 cannot be shown directly, but rather the location of the applied coating is merely indicated by reference arrows 30. The sealing foil 13 is not coated, since in this embodiment it already consists of a material with adequate barrier properties with respect to oxygen.

Figures 4 and 5 show a side view (Figure 4) and a vertical section (Figure 5) of another embodiment of a plastic container 20 with a circular cross section. The plastic container 20 is bowl-shaped with a flat base 22. It has a curved side wall 21,

and its cross section increases in the direction away from the base 22.

The plastic container 20, which is used, for example, to store salads, is also coated over its entire outer surface 25 with a coating 30 that has barrier properties with respect to oxygen. The container lid 23, which is made of the same material as the plastic container 20 in this embodiment, is likewise provided with a coating 30 on its outer surface 26, so that the penetration of oxygen into the closed plastic container 20 is impeded by a coating 30 all around the container.

The invention is not limited to the illustrated embodiments but rather can be widely applied to all containers of this type with a wide variety of shapes, whose contents are to be protected against the penetration of oxygen during extended periods of storage.

List of Reference Numbers

10, 20	plastic container
11, 21	side wall
12, 22	flat base
13	sealing foil
14	pull tab
15, 25	surface
23	container lid
24	edge of lid
26	outer surface of 23
30	coating